

## MEMS RESONATORS AND METHODS FOR MANUFACTURING MEMS RESONATORS

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### ABSTRACT OF THE DISCLOSURE

A first type of MEMS resonator adapted to be fabricated on a SOI wafer is provided. A second type of MEMS resonator that is fabricated using deep trench etching and occupies a small area of a semiconductor chip is taught. Overtone versions of the resonators that provide for differential input and output signal coupling are described. In particular resonators suited for differential coupling that are physically symmetric as judged from center points, and support anti-symmetric vibration modes are provided. Such resonators are robust against signal noise caused by jarring. The MEMS resonators taught by the present invention are suitable for replacing crystal oscillators, and allowing oscillators to be integrated on a semiconductor chip. An oscillator using the MEMS resonator is also provided.

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